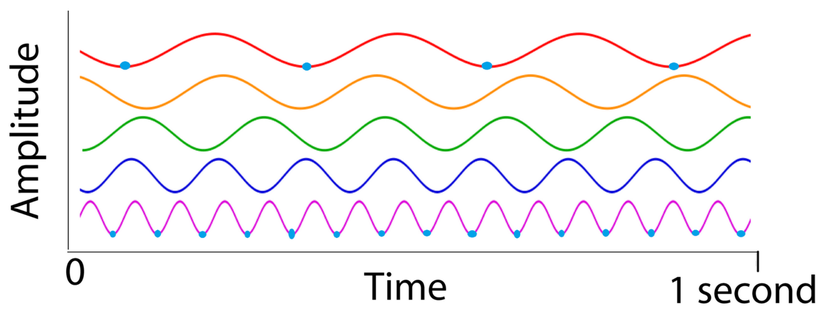
Building a patient-specific seizure detector without expert input using user-triggered active learning strategies

Pieter Buteneers, Dirk Stroobandt and Benjamin Schrauwen
Ghent University, ELIS-Reslab, Sint-Pietersnieuwstraat 41, 9000 Gent, Belgium
Pieter.Buteneers@UGent.be -- http://reslab.elis.ugent.be

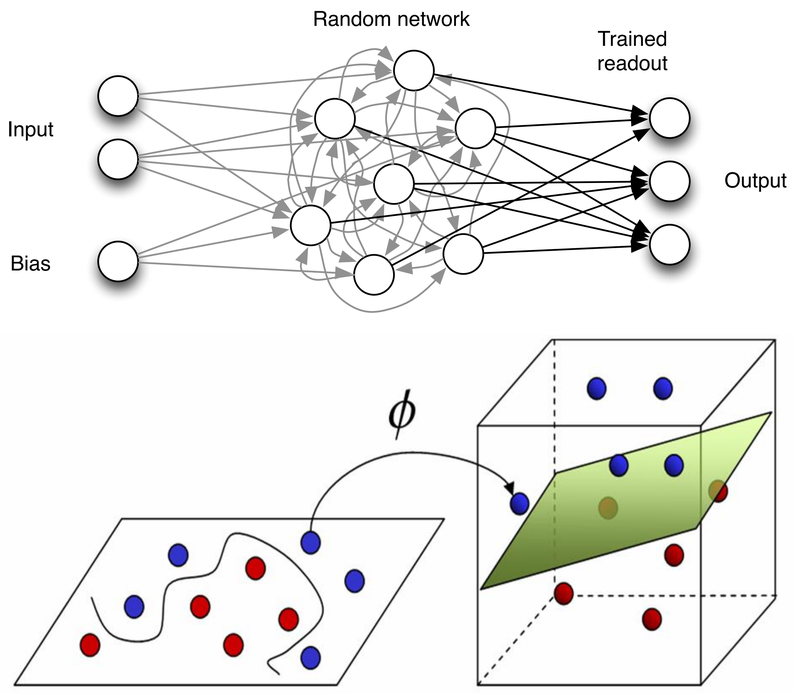
Introduction

Seizure detectors have been developed as a warning system for caregivers and to apply online treatment. Patient-specific seizure detectors perform better than general seizure detectors. However, building patient-specific seizure detectors requires costly video-EEG monitoring and EEG expert time.

Pre-processing



Reservoir Computing



Active Learning

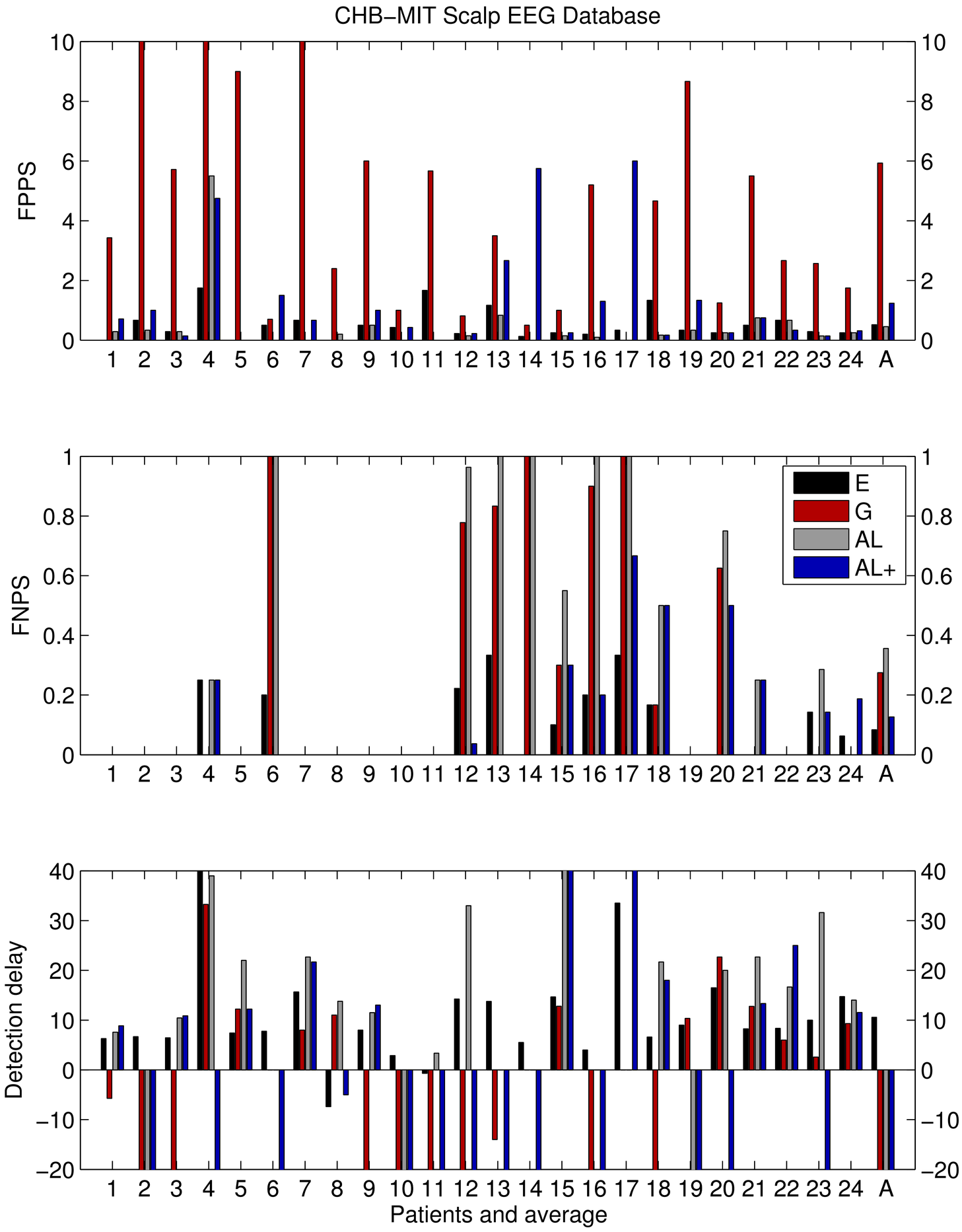
First a general seizure detector is built (G) on all patients except 1. Next, user-triggered active learning strategies are applied on the data of the omitted patient:

- AL : The patient or caregiver pushes a button when a false positive is detected.
- AL+ : The caregiver also pushes a button when a seizure is missed.

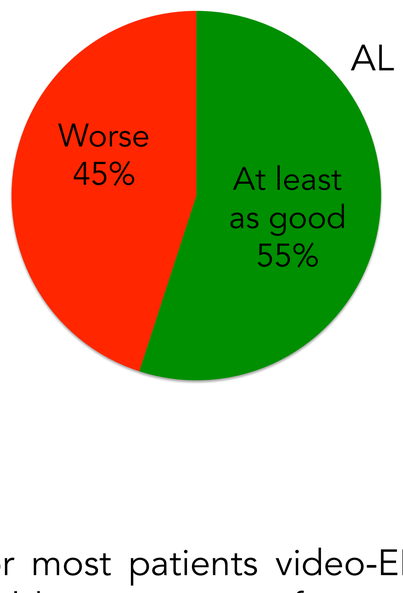
Error Measures

FPPS : False positives per seizure in the dataset
FNPS : False negatives per seizure in the dataset
Delay : Time required to detect a seizure

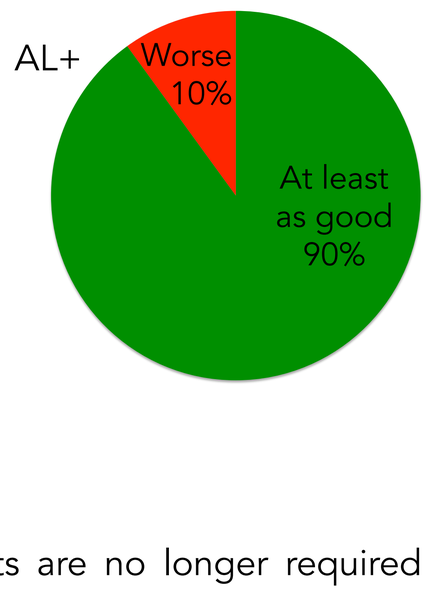
Experiments & Results



Discussion



Comparison per patient with patient-specific model (E).



Conclusion

For most patients video-EEG monitoring and EEG experts are no longer required to build a patient-specific seizure detector.